

REMARKS

Claim 13 is amended. Claim 27 is added. Support for claims 1 and 27 is found on p. 8, l. 3 and p. 9, l. 12.

No new matter is added upon entry of the amendment.

Claims 13, 15, 16-20, and 24-25 remain active.

Applicants traverse the outstanding rejections, and request issuance of the presently pending claims.

It is requested that the Examiner withdraw all of the rejections, as it is believed that the amendment to claim 13 adds another distinguishing feature that differentiates Applicants' invention from the cited prior art. Nowhere in the cited prior art is it disclosed or suggested to expose a precursor membrane capable of being graft polymerized to an oxidative atmosphere comprising argon and oxygen. As claimed, the combination of these two gases in the plasma promotes the formation of surface hydroxyl and carbonyl groups that results in a material time required to attain a steady state voltage is much shorter than that for a material that is not so treated (p. 13, ll. 4-20):

Electrolyte Membrane	Time period (Minute)	Voltage (Volt)
First Embodiment	3	0.75
Comparative Example	20	0.73
Second Embodiment	7	0.65
Comparative Example 2	30	0.65

In the Advisory Action the Examiner states that Kono or Hubbard "plasmas treat the same substrate materials as claimed." It is noted that Kono provides an example of plasma-aided graft polymerization, wherein "the microporous polyolefin film is treated with a plasma...in an atmosphere of argon, helium, nitrogen or air" (col. 7, ll. 16-20). Alternatively, Hubbard discusses that "the polymeric article may be corona-treated by the industry-wide

corona discharge treatment method" (col. 5, ll. 54-55) and other methods (col. 5, ll. 59-61).

These two references do not discuss combining argon and oxygen together in a plasma-based oxidative atmosphere. Furthermore, these two references fail to discuss introducing hydroxyl and carbonyl groups on the surface of the polymer via this method. These two references do not contribute the missing elements of the combined cited prior art. This is further illustrated by revisiting Goldberg's disclosure.

Applicants previously noted that the Rejection principally involves the teachings of Goldberg. In Goldberg a surface of a material is exposed to GDP to activate and/or excite the surface. Manifestly, this exposure is not exposure in an oxidative atmosphere, as presently claimed. This is evidenced by Goldberg at column 4, lines 21-55 and column 8, lines 25-38, where exposure to oxygen is always *subsequent* to exposure. When oxygen is subsequently exposed to the activated and/or excited surface, Goldberg discloses the formation of **peroxy and hydroperoxy** groups, **not** surface **carbonyl** groups, or surface **hydroxyl** groups, as claimed. Upon exposure to the ethylenically unsaturated monomer, the surface is then irradiated with gamma or electron beam radiation to form a polymerized, chemically grafted surface modification. See col. 4, lines 22-51 of Goldberg. Thus, the ethylenically unsaturated monomer (or mixtures thereof) polymerized by gamma or electron beam irradiation, are covalently bonded to the active surface species resulting from the GDP surface treatment. Accordingly, a polymerized, chemically grafted modification is formed on the surface, and the surface is changed from hydrophobic to hydrophilic. In this sense, the activated surface species or sites provided upon exposure to GDP in Goldberg are used for forming a hydrophilic layer, and do not remain on the surface. Thus, the membranes produced by the method of Goldberg would provide an inadequate adhesion property between the membrane and an electrode.

In the present invention, on the contrary, surface carbonyl groups, surface hydroxyl groups, or surface carbonyl groups and surface hydroxyl groups, formed on a surface of a precursor membrane are not lost by graft polymerization, and remain on the membrane. Thus, the adhesion property resulting between the invention membrane and an electrode is improved, allowing for improved performance of, e.g., fuel cells. In this sense, the present invention process as presently claimed is substantially different from anything disclosed or suggested by the combination of references cited in the Official Action, and presents an invention that is patentably distinct from anything described in U.S. 6,242,123.

Applicants note several speculative statements on the part of the Office with regard to Goldberg. See the Advisor Action and page 4 of the Official Action dated July 7, 2003. If these statements constitute the taking of Official Notice, Applicants here present the seasonable challenge discussed in the M.P.E.P., and request support for these statements. In this regard, Applicants note that Goldberg only discusses peroxy and hydroperoxy groups. Nowhere in any reference of record are the presently claimed surface hydroxyl groups and surface carbonyl groups mentioned or suggested. In addition, Applicants note that present Claim 13 is a method claim that requires exposing the surface of a precursor membrane to a plasma in an oxidative atmosphere to generate surface carbonyl groups and/or surface hydroxyl groups. Goldberg is fundamentally different in that exposure to GDP is *not* conducted in an oxidative atmosphere. It thus is to be expected that any subsequent exposure of the Goldberg material to oxygen would form different species.

Accordingly, and in view of the above amendment and remarks, Applicants respectfully request the reconsideration and withdrawal of the outstanding rejections and the passage of this case to issue. Early notification to this effect is respectfully requested.

Respectfully submitted,


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